SUMMARY

The Occupational Safety and Health Administration (OSHA) has been examining various factors concerned with indoor environmental conditions that can lead to preventable morbidity and mortality (material impairment) in workers employed in non-industrial worksites. Existing health data indicate that a substantial number of workers are adversely affected by poor indoor air quality while at work. Poor indoor air quality may result from routine human activities, such as smoking, maintenance activities, or pest control work. It can also be exacerbated by inadequate ventilation system maintenance and operation, poor outside air quality, bioaerosol contamination, and the orrgassing of volatile organic compounds from building materials and furnishings.

In September 1991 OSHA published a Request for Information in the Federal Register to solicit information on indoor environmental quality conditions. To date 1,214 comments have been submitted to the Indoor Air Quality docket [H-122]. Key issues of concern identified in these comments include the lack of ventilation performance standards, lack of worker training on the operation and maintenance of ventilation systems, lack of available technical guidance on indoor air issues and lack of pollution source controls, as in the situation with environmental tobacco smoke (ETS).

OSHA has received numerous petitions for rulemaking since 1987 for regulating environmental tobacco smoke; one other petition specifically requested a standard controlling indoor air quality in the workplace.

The purpose of this Memorandum is to summarize the history of this project and the thrust of the comments received in response to the Request for Information so that an internal decision can be made within OSHA as to whether to proceed with rulemaking.

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LEGAL AUTHORITY

The legal authority to regulate workplace air quality is based on Sections 3(8) and 6(b) of the Occupational Safety and Health Act of 1970 (the Act) (29 U.S.C. 651 et seq.).

BACKGROUND

This section provides a summary of what is going on in Congress, the courts, and in businesses concerned about indoor air quality. Later sections will discuss in more detail the risks and costs involved with poor indoor air quality in non-industrial workplaces.

Health complaints related to poor indoor air quality have increased significantly since the advent of energy conservation measures instituted in the early 1970's. These measures, designed to reduce seasonal energy costs, reduce the infiltration of outside air, thus adversely influencing indoor environmental conditions such as temperature and humidity and allow the concentration of contaminants to increase to levels that influence human health and comfort.

Indoor Air Quality has become a major worker health issue. A recent random sample of office workers in nine demographic areas of this country conducted by Honeywell indicates that at least 24% of the polled workers are dissatisfied with the air quality and 20% indicate that their performance suffers due to the air quality. Submissions to the docket that report data from the United States and Europe, support this incidence of problems. Some indicate an incidence of 50% (Exhibit 3-29, 3-34, 3-505, 3-507). In addition, a recent workers' compensation decision in the State of Wisconsin awarded damages to a group of workers claiming injuries due to sick building syndrome. Numerous workers' compensation claims have been awarded based on the harmful effects of tobacco smoke on nonsmoking workers. The Veterans Administration (VA), under Article 50 (Section 4) of the current contract with the National Association of Government Employees (NAGE), is currently paying 8-25% hazardous duty pay to union members who have to enter Agency-designated smoking areas in performing their duties to care for VA patients or to maintain those smoking areas. In response to action by another union at the VA the Federal Services Impasses Panel recently decided that all VA employees who enter areas in their facilities where smoking is allowed should receive 25% hazardous duty pay. The arbitrator decided that environmental tobacco smoke (ETS) should be included as a toxic substance under Office of Personnel Management (OPM) guidelines and therefore exposed workers are entitled to hazardous duty pay. A staff attorney for the VA has informed us that a letter is being drafted to OPM asserting that if ETS is a toxic substance then OPM should extend this benefit to employees of all Federal Agencies.

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Both the Senate and House of Representatives have recently drafted legislation with provisions requiring governmental agencies, including OSHA, to address indoor air quality issues. The first is the Indoor Air Quality Act (S. 455 and H.R. 1066) and the second is action to amend the 1970 Occupational Safety and Health (OSH) Act (referred to as OSHA reform; S. 1622, H.R. 3160).

Many businesses, of all sizes, are concerned that poor indoor air quality is reducing the productivity of their workforce. The IAQ problem has been estimated by a recent EPA analysis to cost American business tens of billions of dollars annually in terms of employee absenteeism and medical bills (Exhibit 3-1075H2).

Given these concerns, indoor air quality has become a major research interest to academia; state, federal and international agencies; and private groups. The data base is extensive, over 120 credible papers and books have been published in peer-reviewed journals and by reputable publishers on indoor air quality. The subjects of this research include the etiology of sick building syndrome and building-related illnesses, actual case studies, economic and legal impacts of poor indoor air quality, and mitigation techniques.

Concern about the health hazards posed by environmental tobacco smoke (ETS) prompted three public interest groups to petition OSHA for an Emergency Temporary Standard in May 1987. The petitions requested the prohibition of smoking in most indoor workplaces. OSHA determined that available data did not demonstrate the existence of a "grave danger" due to workplace exposure to ETS, within the meaning of §6(c) of the OSH Act. OSHA therefore denied the petitions in September 1989.

In response to the OSHA denial, Action on Smoking and Health (ASH), one of the petitioners, filed a suit in the United States Court of Appeals for the District of Columbia in October 1989 to request a review of the Agency's decision and, if appropriate, the issuance of an order setting aside the denial. The case was dismissed in January 1992, with the understanding that OSHA would make a determination in a reasonable timeframe, based on information obtained from the Request for Information, on the next regulatory or non-regulatory action on this issue.

On July 31, 1992, ASH again petitioned OSHA to take the following actions:

1) Separate ETS from IAQ,
2) Classify ETS, as NIOSH did, as a potential occupational carcinogen, using language from OSHA's Cancer Policy, and
3) Regulate ETS as a carcinogen.

In OSHA's response the Agency felt that the requested actions would neither expedite rulemaking nor better resolve the issue,

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and that the application of the cancer classification scheme outlined in the Cancer Policy in no way obligates OSHA to regulate a substance. It was also felt that it is important not to limit the scope of the project to cancer effects; heart disease, other respiratory diseases, and low-birthweight of children born to nonsmoking mothers exposed to ETS are even more important when assessing the total health impact on nonsmoking workers exposed to ETS. A response to this effect has been prepared and sent to ASH.

The AFL-CIO also submitted a petition to OSHA on March 31, 1992, outlining the need for an indoor air quality standard and requesting that OSHA promulgate such a standard. OSHA responded that such a standard is already under consideration and provided information on the status of the docket review. OSHA agreed to consider the petition in determining what the next step will be concerning indoor air quality.

ADVERSE HEALTH EFFECTS ASSOCIATED WITH POOR INDOOR AIR QUALITY - OTHER THAN ENVIRONMENTAL TOBACCO SMOKE

Common adverse health effects associated with poor indoor air quality are frequently described as: (1) sick building syndrome (sometimes called tight building syndrome), and (2) building-related illness. Sick building syndrome is characterized by general complaints which may include headaches, fatigue, nausea, mucous membrane irritation, coughs, and muscle pain. Generally, these conditions are not easily traced to a single specific substance, but are perceived as resulting from some unidentified contaminant or combination of contaminants.

Building-related illnesses describe those specific medical conditions of known etiology which can often be documented by physical signs and laboratory findings. Such illnesses include sensory irritation when caused by known agents, respiratory allergies, hypersensitivity pneumonitis, Legionnaires' disease, and cancer. These illnesses are often potentially severe and, in contrast to sick building syndrome complaints, are often traceable to a specific contaminant source, such as mold infestation and microbial growth in cooling towers, air handling systems, and water-damaged furnishings.

Dr. James Woods, a recognized authority and researcher on indoor air quality at Virginia Polytechnic Institute and State University (Exhibit 3-745D), has estimated, by using U.S. Department of Energy Reports and survey results of workers affected by poor indoor air quality, that 20 to 30% of nonindustrial buildings may be considered to be problem buildings numbering from 800,000 to 1,200,000 buildings. These figures correspond to an estimated 10 to 25 million occupants with symptoms and signs associated with poor indoor air quality, including building-related illnesses and sick building syndrome.

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Dr. Woods has estimated, based on his observations and data in the literature that an additional 10 to 20% of the remaining buildings have undetected problems and may be a source of continuous problems. Dr. Woods' estimates are supported by independent studies in England and Denmark and are further supported by docket exhibits 3-29, 3-34, 3-505, 3-507, and 3-1075.

Poor indoor air quality can result in serious illness and sometimes even death, as illustrated by the death of a maintenance worker in California in the fall of 1991 due to her exposure to Legionella while at work. NIOSH has stated that of the estimated 40,000 Legionella cases a year in this country, a large proportion occur as the result of workplace exposure. The numbers of cases of building-related illness in the United States has not yet been estimated, however prominent experts, such as Phil Morey, Manager of Clayton Environmental Consultants and Harriet Burge of the Allergy Research Laboratory at the University of Michigan, estimate that radon, volatile organic compounds, ETS, and microbiological agents probably present the greatest risk of premature death or morbidity arising from exposure to the indoor environment (Exhibit 3-505A, Pg. 534).

OSHA published a compliance notice on Indoor Air Quality in October 1990 (CPL 2-2). This notice established compliance policy for dealing with complaints regarding indoor air quality problems and transmitted guidelines to be used in the evaluation of indoor air quality conditions, including IMIS codes for the conditions of passive smoke (IAQ-SMOKE), ventilation (IAQ-VENT), overexposure to PEL (IAQ-PEL), and other conditions (IAQ-OTHER). These IMIS codes have been used by area compliance officers when conducting inspections. Currently, all complaints concerning indoor air quality issues are classified as nonformal, regardless of type of complaint (§ H.1.b.). During the 1991 calendar year, 102 inspections where coded as being related to indoor air quality; 56 were coded as IAQ-VENT, 36 were coded as IAQ-OTHER, and 5 each were coded as IAQ-SMOKE and IAQ-PEL. Of those 102 inspections, 18 resulted in penalties amounting to $29,514.00. Most violations issued were based on related standards, such as hazard communication, respiratory protection, housekeeping and ventilation inside storage rooms and exhaust duct systems. The compliance notice expired in October of 1991. The Office of Health Compliance is redrafting the Notice into an Instruction and updating the material it contains.

It is interesting to note in discussing compliance issues, that 80 to 90 percent of the industrial hygiene work conducted by the Wisconsin Department of Industry is related to what they refer to as "Closed Building Syndrome" (Exhibit 3-10). The compliance experience of other states that submitted comments to the docket was not described in this manner.

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ENVIRONMENTAL TOBACCO SMOKE

A major constituent of poor indoor air quality is often tobacco smoke, commonly referred to as environmental tobacco smoke (ETS) or passive tobacco smoke. A wide range of health effects caused by passive exposure to tobacco smoke has been reported by the Surgeon General, the National Research Council, the Environmental Protection Agency (EPA), and private researchers. These effects range from acute annoyance and eye and respiratory tract irritation to the development of chronic pulmonary disease, cardiovascular disease, and lung cancer. Concern about these effects have led many workers to call OSHA and inquire about the effect of ETS exposure in the workplace and what can be done about such exposure.

Environmental tobacco smoke has been classified as a human carcinogen by the International Agency for Research on Cancer (IARC), the Surgeon General, and the EPA. NIOSH has determined that ETS is a potential occupational carcinogen and heart disease risk factor in nonsmoking workers. The EPA has estimated, in their draft Risk Assessment on ETS, that 3,060 lung cancer deaths in the general population (in never-smokers and former smokers who quit 5 or more years ago who are 35 years of age or older) occur each year due to chronic exposure to environmental tobacco smoke.

Total mortality due to lung cancer, other forms of cancer, and heart disease resulting from ETS exposure, is, of course, expected to be much larger than estimates of lung cancer mortality alone. Total mortality due to these diseases was estimated by Judson Wells, Ph.D., using published risk estimates and population statistics, to be 53,000 deaths per year (in neversmokers 35 years of age or older) (Exhibit 3-449G). This is equivalent to a risk of death from those causes of 1.1/1,000 (53,000 deaths/50,015,000 million exposed nonsmokers). The risk of illness resulting in material impairment is even greater than the risk of death. The number of nonsmokers who become ill with heart and respiratory diseases due to chronic ETS exposure is expected to be much larger than these mortality estimates. Nonsmokers make up a majority of workers in the workforce (e.g., in 1985 33% of men and 28% of women smoked). Health Standards has estimated, using published experimental exposure data, that up to 77% of the nonsmoking workforce, approximately 75 million men and women, is exposed to ETS while at work.

THE PRICE TO EMPLOYEES AND EMPLOYERS OF POOR INDOOR AIR QUALITY:

The few submissions to the docket (Exhibit 3-745D, 3-827A, 3-1075H2) that addressed the cost of poor indoor air quality indicate that even though the estimates are imprecise; they indicate an enormous cost to business and their employees totalling tens of billion of dollars a year in reduced

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productivity (Exhibit 3-827A). Professor Woods included preliminary estimates of visits for medical services due to poor indoor air quality. These estimates have been adjusted by the number of white collar workers perceiving health problems due to poor indoor air quality. These estimates indicate that approximately $500 million per year is spent on medical services to this subgroup of building occupants. This figure is expected to double or triple when the cost of medical services for all occupants of these buildings is estimated.

The source of data for these preliminary cost estimates are various national surveys, such as those published by the Bureau of Labor Statistics and the Department of Energy (Exhibit 3-745D). It is apparent, as pointed out by the EPA, the "[m]any costs of indoor air pollution have not been calculated [due to lack of relevant data]. Nevertheless, because of the large numbers of people and buildings potentially affected, as well as the wide range of effects for which there is an economic cost component, it is reasonable to conclude the aggregate costs of indoor air pollution amount to tens of billions of dollars per year (3-1075H2, Pg. 5-17)."

Costs Associated With Possible OSHA Standard On Indoor Air Quality

Detailed costs of regulation can not be assessed until we know what the provisions of a standard would be. Although we believe that a standard based on effective ventilation systems will be costly, from the material in the record it is expected that these costs would be many times less than the price now paid by employers and employees, as discussed above.

RESPONSE TO REQUEST FOR INFORMATION

OSHA published a Request for Information (RFI) in September of 1991 in order to obtain information necessary to determine whether it is appropriate and feasible to pursue regulatory action concerning indoor air quality in non-industrial workplaces. Issues addressed in the RFI included health effects attributable to poor indoor air quality, ventilation systems performance, exposure assessment, and abatement methods. Information concerning specific contaminants such as ETS, radon, and bioaerosols was also requested.

To date, 1,214 comments have been submitted by interested persons, groups, unions, and industry. The comments can be divided roughly into two groups, technical comments that addressed specific questions in the RFI (17%) and letters and petitions (83%). The technical comments discussed in detail specific questions asked in the RFI. Issues of particular concern identified in the comments included the lack of ventilation performance standards; the lack of worker training on

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the operation and maintenance of Heating Ventilation and Air Conditioning (HVAC) systems; the lack of pollutant source control; and the lack of available technical guidance on IAQ issues and mitigation techniques.

Overall, there is considerable support for a standard. Of the comments that specifically addressed the question of whether OSHA should regulate indoor air quality, an overwhelming majority indicate support for regulation (preliminary estimates indicate approximately 75%). A few suggested OSHA develop non-mandatory guidelines instead of regulations.

REGULATORY OPTIONS

The options listed below deal only with whether to proceed with rulemaking and if so, whether to separate ETS from IAQ. Specific options for what form such a rulemaking should take will be developed if a decision is made to proceed. In that case, a more detailed Decision Memorandum will be submitted to the Assistant Secretary and subsequently to the Policy Review Board.

There are three broad options available to OSHA:

1) Proceed directly to a Notice of Proposed Rulemaking (NPRM);
2) Separate ETS from IAQ and categorize it as an independent project and establish two independent rulemaking projects; or
3) Do nothing.

Each of these options is discussed below.

A. Recommended Option - Publication of a NPRM

Health Standards recommends the publication of a Notice of Proposed Rulemaking (NPRM).

More than enough information is known about how to mitigate and avoid indoor air quality problems for OSHA to proceed with a NPRM. From a technical point or view it is not necessary to identify specific levels of contaminants that are associated with specific health effects in order to mitigate problems. This generic approach is different from OSHA's chemical-specific standards that did develop Permissible Exposure Limits.

When all the health effects, including those caused by environmental tobacco smoke, are considered together, the risk of material impairment to workers exposed to poor indoor air conditions exceeds the level of significance used by OSHA to justify promulgation of other health standards.

In total, the evidence supports a decision to publish a NPRM. Based on responses to the RFI, a proposed standard is feasible

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and practical. In the long-term, employers will benefit economically from a healthier, more productive workforce, reductions in health and life-insurance costs, and reductions in workers' compensation claims and lawsuits.

B. Alternative Option - Separating ETS into an Independent Project

Another option is to separate the issue of ETS from IAQ and establish two independent rulemaking projects.

The data concerning the level of risk due to exposure to environmental tobacco smoke is more complete than overall exposure to poor indoor air quality. The abatement procedures would be more simple than that for all indoor air problems. As a separate rulemaking, OSHA could expedite action on ETS which will be straightforward, while developing a proposal at a slower pace on indoor air quality. The disadvantage to this option is that it would take longer and use more resources to address both issues in separate rulemakings.

C. Alternative Option - Do Nothing

The third option is to do nothing unless the courts or Congress force OSHA to act.

This is not an appropriate alternative in view of the substantive, credible responses to the RFI indicating a need for a standard, and what is known about the causes of poor indoor air quality in non-industrial worksites. Moreover, the means required to mitigate and avoid these problems are available and easily implemented. In the absence of OSHA action on Indoor Environmental Quality Congress has indicated, through Indoor Air and OSHA Reform legislation, that it will legislate such action. In addition, in H.R. 1066, Congress cedes OSHA's authority to develop an indoor air quality standard that applies to workplaces to the Environmental Protection Agency. Such lack of action may also prompt the Court to reconsider its decision on the ASH suit or encourage ASH to initiate another suit.

NEXT ACTION

If it is decided to proceed with rulemaking, the next step will be to prepare a memo for the Policy Review Board (PRB) concerning the decision to proceed to an NPRM on IAQ.

SCHEDULE FOR NPRM

The Health Standards Directorate believes that a proposal could be ready for PRB Review by October 30, 1993.

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